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NOMINAL DIMENSIONS OF CYLINDRICAL MACHINED GRAPHITE ELECTRODES WITH THREADED SOCKETS AND CONNECTING PINS FOR USE IN ELECTRIC ARC FURNACES

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NOMINAL DIMENSIONS OF CYLINDRICAL MACHINED GRAPHITE ELECTRODES WITH THREADED SOCKETS AND CONNECTING PINS FOR USE IN ELECTRIC ARC FURNACES

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Indian Standard

NOMINAL DIMENSIONS OF CYLINDRICAL MACHINED GRAPHITE ELECTRODES WITH THREADED SOCKETS AND CONNECTING PINS FOR USE IN ELECTRIC ARC FURNACES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 January 1979, after the draft finalized by the Industrial Electroheating Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard covers the dimensions and tolerances on length and diameter of electrodes. This also covers dimensions and thread details for graphite nipples, or connecting pins, of tapered shape used with the graphite electrodes.

0.3 In preparing this standard, assistance has been derived from IEC Publication 239 (1967) ' Nominal dimensions of cylindrical machined graphite electrodes with threaded sockets and connecting pins for use in electric arc furnaces ', issued by the International Electrotechnical Commission.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies dimensions and tolerances of turned and threaded cylindrical electrodes and graphite nipples for arc furnaces.

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*Rules for rounding off numerical values (*revised*).

1.2 Graphite electrodes generate electric arc between the electrode and the charge. This arc causes heat generation to melt the charge and in the process of melting the charge, the electrode itself gets consumed at a specific rate.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Low Spot — A flat spot in a localized area untouched by the tool when the electrode is turned as compared with the remainder of the surface.

3. DIMENSIONS

3.1 Electrodes

3.1.1 *Diameter* — The diameters and tolerances on the diameters shall be as given in col 2, 3 and 4 of Table 1.

NOTE 1 — The dimension *B* shown in Fig. 1, shall not be lower than the value given in col 4 of Table 1.

NOTE 2 — The low spot diameter of the electrode shall not exeed 50 percent of the maximum circumference of the electrode.

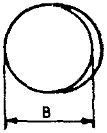

FIG. 1 LOW SPOT OF THE ELECTRODE

3.1.2 *Lengths* — The lengths shall be as given in col 5 of Table 1.

TABLE 1 DIAMETER AND LENGTHS FOR MACHINED AND THREADED GRAPHITE ELECTRODES

(*Clauses* 3.1.1 *and* 3.1.2)

All dimensions in millimetres.

NOMINAL DIAMETER	DIAMETER TOLERANCE			NOMINAL LENGTH
	Maximum	Minimum	*B*	
(1)	(2)	(3)	(4)	(5)
75	78	73	72	1 000-1 200-1 500
100	103	98	97	1 000-1 200-1 500
130	132	127	126	1 000-1 200-1 500
150	154	149	146	1 200-1 500-1 800
175	179	174	171	1 200-1 500-1 800
200	205	200	197	1 200-1 500-1 800
225	230	225	222	1 200-1 500-1 800
250	256	251	248	1 200-1 500-1 800
300	307	302	299	1 200-1 500-1 800
350	357	352	349	1 500-1 800
400	408	403	400	1 500-1 800
450	460	454	452	1 500-1 800-2 100
500	511	505	503	1 500-1 800-2 100-2 400
560	562	556	554	1 500-1 800-2 100-2 400
600	613	607	605	1 800-2 100-2 400

3.1.2.1 Tolerances on length are shown in col 2 and 3 of Table 2, as maximum and minimum length values.

3.2 Nipples

3.2.1 *Threading* — The characteristics of nipple threading for electrodes from 75 to 600 mm diameters are shown in Table 3.

3.2.2 Table 4 shows in detail the dimensional features of 4 TPI electrodes from 75 to 600 mm diameter.

TABLE 2 LENGTH TOLERANCES FOR MACHINED AND THREADED GRAPHITE ELECTRODES

(*Clause* 3.1.2.1)

All dimensions in millimetres.

Length, Tolerance			Short Length*, Tolerance	
Nominal	Maximum	Minimum	Maximum	Minimum
(1)	(2)	(3)	(4)	(5)
1 000	+ 50	— 75	— 75	— 200
1 200	+ 50	— 100	— 100	— 225
1 500	+ 50	— 100	— 100	— 275
1 800	+ 75	— 100	— 100	— 275
2 100	+ 75	— 125	— 125	— 275
2 400	+ 75	— 125	— 125	— 275

*Each consignment may comprise up to 15 percent of short-length electrodes.

TABLE 3 THREADINGS OF NIPPLES OR CONNECTING PINS

(*Clause* 3.2.1)

Characteristic of Nipple Thread	Electrode Diameters (75 to 600 mm Inclusive)
(1)	(2)
Type of nipple used	4 TPI
Pitch value	6·35 mm or 4 threads per inch
Pitch angle	60°
Thread design	As represented in Fig. 2
Taper value	The taper angle is equal to 2α such that: $\tan \alpha = \frac{2{\cdot}00}{12{\cdot}00}$

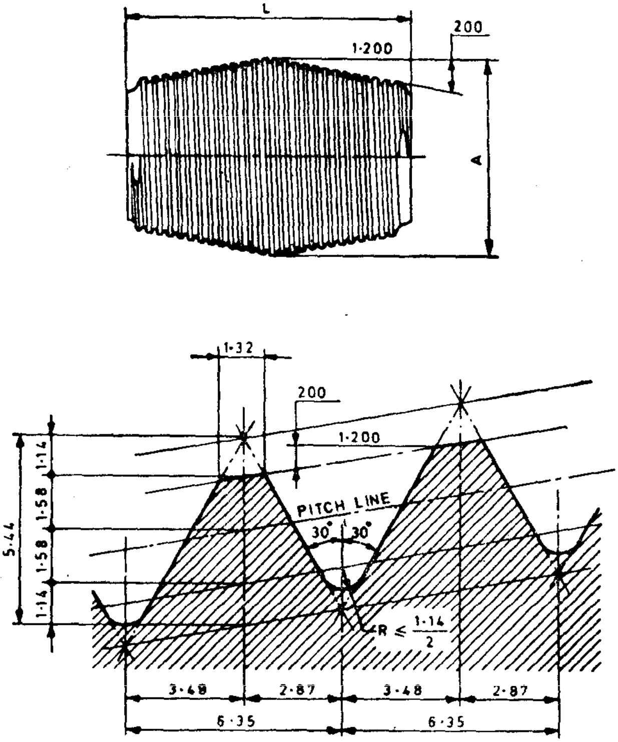

FIG. 2 4 TPI TAPER JOINT

TABLE 4 CHARACTERISTICS OF THE 4 TPI JOINT FOR ELECTRODES OF DIAMETER FROM 75 TO 600 mm INCLUSIVE

(*Clause* 3.2.2)

Electrode Diameter	Nipple Size			Denomination
	Diameter	Length		
	A	*Max*	*Min*	
(1)	(2)	(3)	(4)	(5)
mm	mm	mm	mm	
75	46·04	76·20	73·10	46 T 4
100	69·85	101·60	98·50	69 T 4
130	79·38	127·00	123·90	79 T 4
150	92·08	139·70	136·60	92 T 4
175	107·95	165·10	162·00	107 T 4
200	122·24	177·80	174·70	122 T 4
225	139·70	177·80	174·70	139 T 4
250	152·40	190·50	187·40	152 T 4
300	177·80	215·90	212·00	177 T 4
350	203·20	254·00	250·10	203 T 4
400	222·25	304·80	300·90	222 T 4
450	241·30	304·80	300·90	241 T 4
500	269·88	355·60	351·70	269 T 4
560	298·45	355·60	351·70	298 T 4
600	317·50	355·60	351·70	317 T 4